

United States Department of Agriculture Forest Service

Aviation Safety Alert

No. 2005-01

July 1, 2005

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Subject: Helicopter External Load Operations, Safety and Risk Assessment

Area of Concern: Fire and Aviation Operations

Distribution: Fire and Aviation Personnel

The most important part of any risk assessment is to identify the hazard(s) of a particular operation before taking action. In our firefighting discipline it can be challenging to decide which poses the greater hazard, when every option you consider contains potential for multiple ground and aerial incidents.

Recently a helicopter was supporting a fire with bucket drops. A burning snag on the fireline was causing concern with visible widow-makers, a steep slope, active burning, and exposure across a handline. Fire personnel, including helitack personnel and the IC were involved in a deliberate risk assessment process before electing to use the helicopter for additional mitigation. Previous water drops had been unsuccessful in extinguishing the burning snag. They subsequently elected to use the bucket as a wrecking ball against the tree and the pilot accepted their decision. Several personnel stated they had seen this done in several other geographic areas. After bumping the tree a few times enough widow-makers were dislodged that fallers felt safe in cutting the snag down. Finally, the mission was accomplished without injury to ground personnel or damage to the helicopter, crew and/or bucket.

However, analysis of earlier mishaps shows that we have not always been so lucky. Review of the last 10 years of accident history shows 26 helicopter accidents, of them 19 accidents (73%) occurred while operating with an external load, 14 occurred with buckets (54%).

For example, an AS316 in August 1998 snagged a bucket in trees, snapped the long line which then wrapped around the tailrotor and the pilot lost control of the aircraft. The pilot survived but the aircraft was a total loss.

A Bell 206 in August 2004 struck the main rotor blades in a tree top while attempting to heli-mop the base of a pine tree. While lowering the bucket along the tree trunk the pilot lost situational awareness and the main rotors struck the tree causing significant damage and down time.

In 2003 a contract pilot elected to use a longline for extraction of a parachute from a treetop. He later stated to the disciplinary Pilot Review Board that he had heard that smokejumpers often used helicopters for similar "retrieval" missions.

After reviewing several incidents of similar risk taking, the Board decided that the type of behavior being exhibited should not be tolerated. The pilot's card was removed until he had attended additional aviation safety training to increase his risk awareness.

Mitigation of Risk for Helicopter External Loads

There is no existing regulation or policy that restricts the use of a helicopter bucket, or any other external load from being used to batter trees, but it's not a good idea. Just because the manual doesn't say that you can't, doesn't mean that it is acceptable or safe. Here are some "common sense" practices to apply to any external load when attempting to assess and/or mitigate risks.

- Use the equipment within the intended design application (i.e. to carry a load from point A to point B not as a wrecking ball or aerial grappling tool)
- Plan the pickup and delivery to be accomplished with the main rotors well above the top of the canopy.
- Landing areas and drop zones should be at least one and a half times the rotor diameter.
- Avoid confined area operations in gusty wind conditions. (Ref. IHOG Chapter 6)
- Keep buckets above the canopy line. Threading buckets down through trees accepts unnecessary risk.
- Helicopter mopping operations are not efficient and increase exposure to risk of damage to the helicopter and injury to the pilot.
- Match the aircraft and equipment to the mission after considering density altitude and weight and balance for "hot, high and heavy" conditions.
- Avoid being caught up in a "Can DO" attitude that leads you to any helicopter mission that requires a non-standard practice, or operation not required by the contract.
- Remember that over 70% of all Forest Service helicopter accidents have involved external load operations. When performing a risk assessment ask yourself, "what can go wrong here?"
- When given several options, generally choose to apply the most conservative approach at accomplishing the mission.

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